

## REMARKS

Applicants have amended claims 1, 4, 5, 6, 8, 9, 10-12, 14, 16-18, 20, 25, 30-32, 35-37, 40, 41, 50, 51, 54, 56, 57, 82, 84, 86-96, 99, 101 and 102. Claims 33-34 and 60-81 are withdrawn from consideration.

### 35 U.S.C. §112 para. 2 – Indefiniteness

Applicants have amended claims 1, 4, 5, 6, 8, 9, 10-12, 14, 16-18, , 20, 25, 30-32, 35-37, 40, 41, 50, 51, 54, 56, 57, 82, 84, 86-96, 99, 101 and 102 to address issues of lack of antecedent basis, typographical errors, inconsistent terms, improper Markush language, and lack of clarity. Thus, claims 9, 11 and 30 have been amended to replace intake with “input”, for consistency with other claims and language in the specification, and claim 56 has been amended to read “input liquid” rather than “liquid from the input” to create proper antecedent basis for “input liquid” in claim 58. Similarly, other claims such as claims 1 and 51 have been amended to define the liquid as input liquid, for clarity and to establish antecedent basis for later dependent claims.

Thus, for example, claims 8 and 96 has been amended to replace “condensed liquid product” with “distilled liquid product” for consistency with claim 1 and language in the specification; claim 50 was amended to delete the word “mainly” after “comprises”, for reasons of clarity; claims 88, 91 and 92 were amended to clarify that the liquid is the distilled liquid product; claim 16 has been amended to replace “drive” with “system”, for clarity; and claims 1, 4, 5, 6, 17, 18, 25, 35, 36, 40, 41, 54, 94, 96 and 102 have been amended to replace vaporizer” with “evaporator” for consistency with other claims and language in the specification.

In addition, claims 10, 12, 14, 31, 37, 57, 86, 87, 89, 90, 92, 99 and 101 have been amended to recite proper Markush group language; and claims 10, 12, 20, 32, 36, 87, 88, 91, 93, 95, 99, 101 and 102, for example, have been amended to remove or modify indefinite, unclear and superfluous language.

And finally, claims 5, 6, 8, 14, 36, 40, 51 and 87, for example, have been amended to address issues with lack of antecedent basis for claims later dependent claims.

Non-Statutory Obviousness-Type Double-Patenting

Applicants will file the necessary Terminal Disclaimer with respect to U.S. Application Serial No. 10/713,591 at the time any claim is indicated as allowable.

35 U.S.C. § 103(a) – Obviousness

**Claims 1-18, 24, 35-40, 52-59 and 82-102** are rejected as obvious over GB 121 1236 or Huse (US3,956,072) in view of Stewart (US1,668,532). As currently amended, independent system claims 1 and 35 and independent method claim 36 all recite the limitation “a feedback control loop comprising level sensors and variable-flow valves for controlling fluid flow and maintaining fluid levels at near constant levels in the system” (claims 1 and 35) or the step “controlling fluid flow and maintaining fluid levels in the system at near constant levels using a feedback control loop comprising level sensors and variable-flow valves.” Support for these amendments is found in the drawings (see e.g. Fig. 14A) and at p. 23, line 10 through p. 26, line 16, among other places, in the current application.

In contrast, GB 121 1236 (“the GB patent”) (directed to an improved distillation apparatus and methods of using the apparatus which employ a liquid ring pump vapor compressor and efficient flow of liquid and efficient heat exchange between overflow liquid and incoming liquid, to maximize energy efficiency) is silent with respect to any particular mechanism or system for fluid control and maintaining fluid levels. There is no mention of sensors for maintaining fluid levels or variable-flow valves for controlling fluid flow. The only discussion of valves in the GB patent is the pressure differential valve **34**, and the pressure reducing valve **44**, optionally present to vent pressure in the system and flow conduits. Nothing suggests that there is a feedback control loop which monitors flow and fluid levels in the disclosed distillation system.

Huse is equally non-informative regarding a specific mechanism for monitoring fluid flow and maintaining fluid levels in the system. Huse discloses a liquid distillation system utilizing a two stage vapor compressor, the first of which is a rotary positive displacement type compressor and the second of which is a liquid ring pump type compressor. Although Huse discloses that “the control means which form a part of this invention can be effected by bypass control valves around either or both stages, speed control means such as constant torque drives,

or other means most suitable for the specification application (see Huse, col. 4, lines 20-25), nothing in this catch-all paragraph provides insight to enable one skilled in the art to modify the disclosed two stage compression distillation system to design a feedback control loop for monitoring fluid flow and maintaining fluid levels at near constant levels in the overall system using level sensors and variable-flow valves.

Stewart adds nothing to this discussion. Stewart discloses a liquid ring pump with a rotatable housing (rotary machine), which arguably could be used in the apparatus of the GB patent or Huse patent, but Stewart does not teach a feedback control loop for any of the systems that Stewart suggests could benefit from using such a rotary machine, particularly a liquid distillation system.

As detailed in MPEP § 2142, three criteria must be met to support a *prima facie* case of obviousness - motivation/suggestion to modify or combine reference teachings; reasonable expectation of success; and all claim limitations must be taught/suggested by cited reference(s) - paraphrased from *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). In the present case, there is no *prima facie* case of obviousness because the references cited, alone or in combination, do not set forth all the claim limitations of the presently claimed invention, and there is no suggestion or teaching in any of the references, or the knowledge generally available to those skilled in the art to first combine and then modify the cited references to devise a feedback control loop for monitoring fluid control and maintaining fluid levels in the system with level sensors and variable control valves, as claimed in amended independent claims 1, 35 and 36.

**Claims 19-23, 25-32 and 41-48** are rejected as obvious over GB 121 1236 or Huse (US3,956,072) as modified by Stewart (US1,668,532) and further in view of Benian (US5,667,683) or Cooksley (US4,045,293).

Benian or Cooksley have been cited to show that it was known to use a multi-unit filter and siphon pump for the vapor pump. But Benian adds nothing which would overcome the basic failing of the primary combination of references – lack of a teaching for all the claim limitations (feedback loop), and lack of suggestion to modify the cited references – so the additional references do not cure the lack of support for a *prima facie* case of obviousness. And, although Cooksley discloses valves and a control circuit (see Cooksley, Abstract and col. 6-7) the valves are simple open/close ball valves which control and direct flow by an all-or-nothing mechanism, not variable flow valves, and the control circuit is simply an electric switchboard to turn on or

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turn off the various mechanisms of the system which are electrically operated. Moreover, the sensors disclosed in Cooksley (elements 64 and 66 – see col. 6-7) merely serve to open and close fill constant flow valves, or open and close constant flow drain valves in the *boiler tank*, when the water level drops or reaches a sufficient level, they do not maintain fluid levels at a near constant level within the entire system.

**Claims 10, 37 and 92** are rejected as obvious over GB 121 1236 or Huse (US3,956,072) as modified by Stewart (US1,668,532) and further in view of Trusch (US4,316,774) or Kikkawa (US4,437,933).

As discussed for the additional references Benian or Cooksley, above, neither Trusch nor Kikkawa adds anything to the basic combination of references cited that would support the obviousness rejection against the independent claims 1, 35 and 36. Trusch and Kikkawa are cited to show that it was known to pre-treat or post-treat liquids being processed to obtain a more desired purified product. But again, neither references teaches the limitations of the claimed feedback loop, and neither references provides any suggestions for how one might modify the purification system to arrive at such a feedback loop.

**Claims 49-51** are rejected as obvious over GB 121 1236 or Huse (US3,956,072) as modified by Stewart (US1,668,532) and further in view of Sneedden (US3,603,082) or Straka (US5,761,903). In the same way that Benian or Cooksley and Trusch or Kikkawa do not add anything to the basic combination of cited references to support a *prima facie* case of obviousness, Sneedden or Straka are likewise uninformative. Sneedden and Straka are cited to show that it was known in the art to use a clean-burning gas engine, and so it would have been obvious to add such an engine to the claimed distillation system and method of using the system. But, Sneedden and Straka do not provide guidance for how to design and utilize a feedback loop for a liquid distillation system for controlling fluids and maintaining fluid levels at near constant levels in the system, as recited in the independent claims of the instant invention. For that reason, neither Sneedden nor Straka bolster the alleged *prima facie* case of obviousness, which fails for lack of the required legal criteria to disclose/teach all the limitations of the claimed invention, and to teach/suggest modifying the combination of references to arrive at the instantly claimed invention.

In summary, the primary combination of the GB patent or Huse with Stewart does not disclose or teach a feedback loop, and does not suggest the modification for designing or adding such a feedback loop to a liquid distillation system. Benian arguably discloses a siphon pump to pump liquid into a vapor pump, and Benian and Cooksley disclose multi-unit filters, but neither disclose multi-unit flip-filters. Cooksley discloses simple on/off ball valves and a control circuit for controlling electronically coupled switches in the evaporator/condenser purification system disclosed therein which does not comprise a vapor pump, and discloses sensors for detecting a decreased or increased fluid level in the boiler tank, but does not disclose a feedback loop with variable flow valves and level sensors for controlling fluid and maintaining fluid levels at near constant levels in a distillation system, and provides no insight for modifying the disclosed control circuit or ball valves to arrive at such a feedback loop for a distillation system which also comprises a vapor pump.

Trusch and Kikkawa disclose pre-treatment and post-treatment of fluids in a urine-water recovery system (Trusch) or a radioactive waste/water recovery system (Kikkawa), neither of which comprise a vapor pump in the disclosed systems, and neither provides any insight for how one skilled in the art might modify a liquid distillation system comprising a vapor pump to design/add/use a feedback loop as claimed in the instant invention.

And finally, Sneed and Straka disclose clean-burning gas engines, arguably suitable for use with the presently claimed liquid distillation system, but neither cures the failings of the primary references, or additionally cited references, with respect to the feedback loop and lack of a prima facie case of obviousness for the independent claims 1, 25, 35 and 36 which recited such a limitation. In fact, of all the additional references cited in combination with the primary three references, there is not single combination of *any* of the cited references which teaches such a limitation, or suggests a modification to arrive at such a modification.

Applicants would also like to point out that the limitations of dependent claims 16 and 46 (system/method further comprises an electric motor) or claim 93 (measuring the total dissolved solids in a blowdown stream; adjusting a source feed rate if the TDS is above a prescribed level) are not taught or suggested by any of the cited references, alone or in combination.

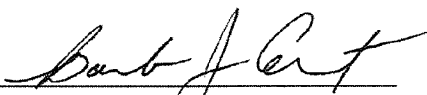
**CONCLUSION**

For at least the above-cited reasons, Applicants respectfully submit that the combinations of references do not support a rejection for reasons of obviousness. Applicants thus request withdrawal of the obviousness rejections and early notice of allowance is respectfully solicited.

Applicants believe that only a two-month extension fee is required; however, if any additional extension fees are required for the timely consideration of this application, please charge deposit account number 19-4972. The Examiner is requested to telephone the undersigned if any matters remain outstanding so that they may be resolved expeditiously.

Respectfully submitted,

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Barbara J. Carter  
Registration No. 52,703  
Attorney for Applicant

BROMBERG & SUNSTEIN LLP  
125 Summer Street  
Boston, MA 02110-1618  
Tel: (617) 443-9292 Fax: (617) 443-0004